UCLouvain

MATH2M1

2024 - 2025

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**MATH2M1 -  Introduction**

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## Introduction

**Introduction**

The Master 60 in Mathematics offers

- a thorough education in cutting-edge fundamental mathematics;
- an interdisciplinary introduction to physics, statistics, probability, cryptography, information theory, financial mathematics, actuarial science, etc.;

  teaching based on your personal learning history;
- the possibility of moving directly to the second year of the Master 120 in mathematics and to the teacher training certificate (upper secondary education).

**Your profile**

You

- have a sense of the precision and rigour of reasoning
- wish to develop your analytical skills and apply your capacity for reasoning and your spirit of abstraction in order to understand, model and solve complex situations in every field of application of mathematics.

**Your future job**

Whatever his specialisation, the mathematician will be able to exercise his talents in a variety of very different professional sectors and to make the mosiicise h9L6pxkoye tollse hhoiety of veici75.149ariions in evetr h arhe pterietlo yowad orommatics.

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## MATH2M1 -  Teaching profile

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## Learning outcomes

By the end of the course the student will have acquired the knowledge of the discipline and the transferable skills needed to practise the many professional activities that require substantial mathematical skills: these are highly varied professions in which mathematics interacts with other fields and mathematicians collaborate with people who come from different backgrounds.

The programme offers a general education in the major fields of fundamental mathematics, including recent advanced subjects, and allows the student to deal in depth with closely related fields that have already been introduced in the Bachelor in Mathematics (especially physics, but also statistics, actuarial science, and computing).

As with anyone who has a university degree from UCL, the graduate Master in Mathematics will be capable of taking a critical, constructive and innovative view of the present-day world and its problems, of acting as a responsible and competent citizen in society and in his professional milieu, of independently acquiring and using new knowledge and skills throughout his professional life, and of managing major projects in all their aspects, both individually and as part of a team.

On successful completion of this programme, each student is able to :

1) master the disciplinary knowledge and basic transferable skills whose acquisition began in the Bachelor programme. He will have expanded his basic disciplinary knowledge and skills.

• Choose and use the fundamental methods and tools of calculation to solve mathematical problems.
• Recognise the fundamental concepts of important current mathematical theories.
• Establish the main connections between these theories, analyse them and explain them through the use of examples.

2) show evidence of abstract thinking and of a critical spirit.

• Recognise the fundamental concepts of important current mathematical theories.
• Identify the unifying aspects of different situations and experiences.
• Argue within the context of the axiomatic method.
• Construct and draw up a proof independently, clearly and rigorously.

3) communicate in a scientific manner.

• Write a mathematical text in French according to the conventions of the discipline.
• Structure an oral presentation and adapt it to the listeners' level of understanding.
• Communicate in English (level C1 for reading comprehension, level B2 for listening comprehension and for oral and written expression, CEFR).

4) show evidence of independent learning.

• Find sources in the mathematical literature and assess their relevance.
• Correctly locate an advanced mathematical text in relation to knowledge acquired.
• Ask himself relevant and lucid questions on a mathematical topic in an independent manner.

5) analyse, in depth and from a variety of viewpoints, a mathematical problem or a complex system relating to scientific disciplines other than mathematics in order to extract the essential features and relate them to the best-suited theoretical tools.

rien à ajouter

## Programme structure

The programme for the Master 60 in Mathematical Sciences is composed of 60 credits over a single year of study. It includes core subjects and optional courses.

The core subjects of 20 credits, of which 18 credits are for the dissertation, are compulsory for all students.

All students complete the programme by choosing at least 40 credits from the list of courses offered.

Courses already taken in the in-depth minor in mathematical sciences may not be included in the Master programme.

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## MATH2M1 Programme

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# Detailed programme by subject

## CORE COURSES [20.0]

O Mandatory
⊗ Optional
△ Not offered in 2024-2025
⊘ Not offered in 2024-2025 but offered the following year
⊕ Offered in 2024-2025 but not the following year
△ ⊕ Not offered in 2024-2025 or the following year
🟨 Activity with requisites
🌐 Open to incoming exchange students
🌐 Not open to incoming exchange students
[FR] Teaching language (FR, EN, ES, NL, DE, ...)

Click on the course title to see detailed informations (objectives, methods, evaluation...)

# Optional courses [40.0]

## OPTIONAL COURSES [40.0]

⬦ Mandatory
❈ Optional
△ Not offered in 2024-2025
⊘ Not offered in 2024-2025 but offered the following year
⊕ Offered in 2024-2025 but not the following year
△ ⊕ Not offered in 2024-2025 or the following year
🟨 Activity with requisites
🌐 Open to incoming exchange students
🌐 Not open to incoming exchange students
[FR] Teaching language (FR, EN, ES, NL, DE, ...)

Click on the course title to see detailed informations (objectives, methods, evaluation...)

# The programme's courses and learning outcomes

For each UCLouvain training programme, a reference framework of learning outcomes specifies the the skills expected of every graduate on completion of the programme. Course unit descriptions specify targeted learning outcomes, as well as the unit's contribution to reference framework of learning outcomes.

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## Non university Bachelors

> Find out more about links to the university

## Holders of a 2nd cycle University degree

| Diploma | Special Requirements | Access | Remarks |
|---------|----------------------|--------|---------|
| **"Licenciés"** | | | |
| | | - | |
| **Masters** | | | |
| | | - | |

### Holders of a non-University 2nd cycle degree

## Access based on validation of professional experience

> It is possible, under certain conditions, to use one's personal and professional experience to enter a university course without having the required qualifications. However, validation of prior experience does not automatically apply to all courses. Find out more about Validation of priori experience.

## Access based on application

Access based on application : access may be granted either directly or on the condition of completing additional courses of a maximum of 60 ECTS credits, or refused.

The first step in the procedure is to submit a file online ( see https://uclouvain.be/en/study/inscriptions/futurs-etudiants.html).

Students who wish to be admitted on the basis of a dossier are invited to consult the criteria for the evaluation of application.

## Admission and Enrolment Procedures for general registration

# Teaching method

Whenever possible, teachers in the School of Mathematics give priority to close supervision: small-group work, individual tuition, rapid and personalised feedback on activities, active participation of students in the School's teaching decisions. All the courses in the programme contribute to the acquisition of skills such as the capacity for abstract thinking and for reasoning. Other skills (aptitude for communication, independent learning, document research) are especially exercised in seminars specific to the focuses (where students are responsible for work progress), in work linked to the preparation of the dissertation. The interdisciplinary character of the programme is reinforced by the presence in the options of courses taken from the Masters programmes in physical sciences, in statistics and biostatistics, in actuarial science and in applied mathematics.

# Evaluation